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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,578	10/24/2003	Se-Ho Lee	5649-1194	9027

20792 7590 04/04/2007
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PO BOX 37428
RALEIGH, NC 27627

EXAMINER

PHAM, LONG

ART UNIT	PAPER NUMBER
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2814

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/04/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/692,578

Applicant(s)

LEE, SE-HO

Examiner

Long Pham

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 and 24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4 and 6 is/are allowed.
- 6) ☒ Claim(s) 1,3,5,8-11 and 24 is/are rejected.
- 7) ☒ Claim(s) 2 and 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 5, 8, 9, 10, 11, and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Gonzalez et al. (US pat 5,831,276).

With respect to claim 1, Gonzalez et al. teach a structure in a phase changeable or chalcogenide memory cell, comprising (see figs. 12 and 12a and associated text):

A bottom electrode 32b having an interlayer dielectric layer 34 thereon, the bottom electrode having a recess therein that extends beyond a boundary between the bottom electrode and the interlayer dielectric (see fig. 12a) ; and

A phase changeable or chalcogenide layer 32b in the recess including a protruding portion of the of the phase changeable layer that protrudes into the bottom electrode beyond the boundary, wherein the phase changeable layer contacts the bottom electrode within the confine of the recess.

With respect to claim 3, Gonzalez et al. further teach the interlayer dielectric layer includes a contact hole with the phase changeable layer therein on the recess. See figs. 12 and 12a and associated text.

With respect to claim 24, Gonzalez et al. teach a structure in a phase changeable memory cell, comprising (see figs. 1-32 and associated text):

A bottom electrode 32b having an interlayer dielectric layer 34 thereon; and

A phase changeable layer 32a extending through the interlayer and protruding into a recess in the bottom electrode wherein the phase changeable layer contacts the bottom electrode with confines of the recess.

Further with respect to claim 24, Gonzalez et al further teach the bottom electrode defines a sidewall of the recess that contacts the protruding portion of the phase changeable layer 120. See figs. 12 and 12a and associated text.

With respect to claim 5, Gonzalez et al. teach a phase changeable memory cell, comprising (see figs. 12 and 12a and associated text):

Bottom electrodes 32b disposed over a semiconductor substrate 200;

An interlayer dielectric layer 34 formed over the semiconductor substrate having the bottom electrodes; and

A plurality of data storage elements 32a extended through the interlayer dielectric layer to connect with the bottom electrodes, respectively, wherein, each data storage element is extended into the bottom electrode to predetermined depth so that a portion of the sidewall of the data storage element extends into the bottom electrode (see fig. 12a).

With respect to claim 8, Gonzalez et al. further teach the bottom electrode 32b comprises of TiN. See col. 11, lines 50-60.

With respect to claim 9, Gonzalez et al. teach further teach the data storage element comprises a phase changeable pattern 32a electrically connected with the bottom electrode and an upper electrode 32c formed on the phase changeable pattern. See figs. 12 and 12a and associated text.

With respect to claim 10, Gonzalez et al. further teach the top electrode 32b comprises of TiN. See col. 11, lines 50-60.

Allowable Subject Matter

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Claims 4 and 6 are allowed.

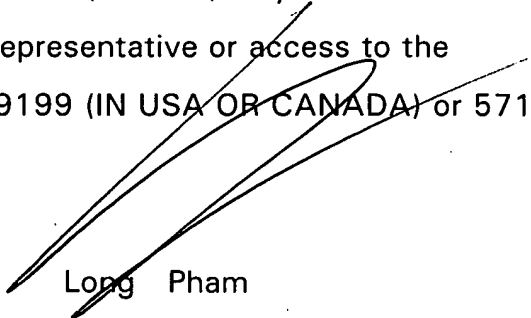
Claims 2 and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Long Pham whose telephone number is 571-272-1714. The examiner can normally be reached on Mon-Frid, 10am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Long Pham
Primary Examiner
Art Unit 2814

LP

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